

TAPPING IN — A geothermal well operated by Ormat in the Imperial Valley's East Mesa area. While there appears to be enough of a resource beneath the valley to support exist-

ing development, officials are uncertain how much more development the geothermal reservoir can support.

—T-H photo by Dave Harada-Stone

But 400 of those megawatts have been idled because the reservoir upon which the area's power plants draw is running out of steam.

Pacific Gas & Electric, which relies on the Geysers for 10 percent of its generating capacity, had seen its production drop

by 22 percent, or about 300 megawatts, as of late last year.

At a hearing last September before the California Energy Commission, PG&E noted its steam suppliers were projecting an average annual rate of decline of 10 to 14 percent. The declines have varied widely

depending on the location of the geothermal wells.

A spokesperson for Unocal Corp., developer of most of the region's geothermal wells, told the commission the decline is

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FUTURE: Resources limited?

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likely due to a combination of factors, including the accelerated decline of individual wells; increasing "interference," or the diversion of steam from an existing well into a new one; the discovery of corrosive steam in the northern portion of the Geysers field, thus reducing the potential steam supply; and higher levels of non-condensable gases in the steam.

PG&E has modified its equipment at the Geysers to make better use of the steam it does get out of the ground. Other potential remedies implemented or under study include reinjection of geothermal fluids to "recharge" the underground reservoir — a measure taken by virtually all geothermal developers in the Imperial Valley — and drilling additional and deeper wells.

Whatever the cause of and the answer to the apparent depletion of the Geysers resource, officials in the Imperial Valley are hopeful they can avoid a similar surprise here.

Given the relative youth of the Imperial Valley's geothermal fields — most of the development has taken place in the past five years — it's still too early to tell how long the resource may last, said Tim Boardman, geothermal district engineer for the California Division of Oil and Gas.

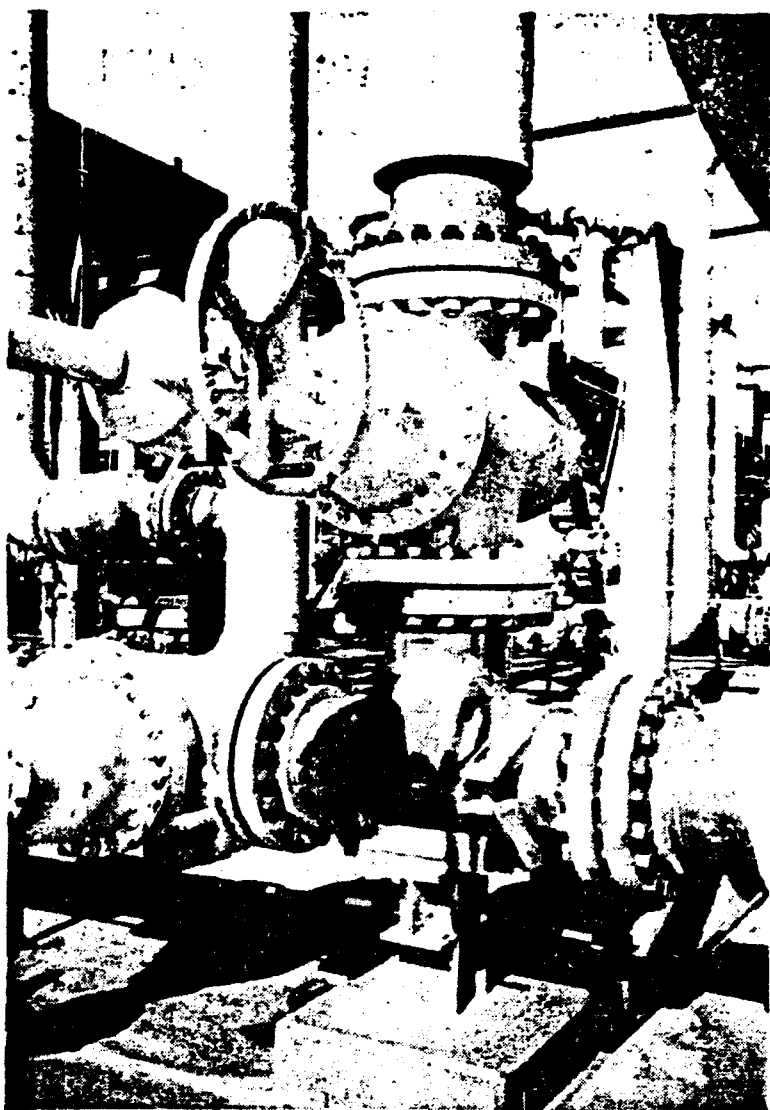
"You do expect you will have depletion in time," he said. "We are watching it very closely. Hopefully we can predict it a little closer (than in the Geysers)."

He noted that the Geysers field was developed before a lot was known about geothermal resources, "when they thought geothermal was a renewable resource."

He pointed out that the Geysers field remains hot. What's missing is the water from which the subterranean heat generates steam.

"We're reinjecting water at a high rate (in the Imperial Valley)," he said.

The resources in the two areas



—T-H photo by Dave Harada-Stone

HEAVY DUTY PLUMBING — A jumble of piping and valves directs steam to the turbines of Unocal's Salton Sea Unit 3 power plant in California's Imperial Valley.

are also markedly different. While the 200-plus wells in the Imperial Valley tap a reservoir made up largely of geothermal brines, or hot, salt-laden fluids. The resource in the Geysers, is made up mostly of steam.

What the disappointments in the Geysers and the as yet limited experience in the Imperial Valley suggest for development in Hawaii is unclear.

Critics of geothermal development in Puna often point to the decline of the Geysers and suggest the same fate awaits geothermal energy on the Big Island. They have relied for support, in part, on testimony in 1982 by Robert Decker, then scientist in charge of the Hawaiian Volcano Observatory.

Speaking before the state Board of Land and Natural Resources, Decker said his esti-

mates of the thermal resource beneath Kilauea Volcano indicated that extracting anything in excess of five megawatts from Kahaualea, then the site of a proposed geothermal development, would result in the depletion of the geothermal resource.

Other experts have said the geothermal resource beneath the volcano could sustain a much larger yield. And Decker himself, in his 1982 testimony, indicated the Big Island could probably meet its own electricity needs with geothermal, but might be depleting the resource should it export more than 50 to 100 megawatts of power.

"And I don't know how long it would take to deplete it," Decker added at the time. "It may take a couple hundred years. Of course, we mine our other resources, and they're depletable too."